Y2SD1-mini

Stepper Driver Hardware Manual

Guangdong Kaifull Electronics Technology Co., Ltd.

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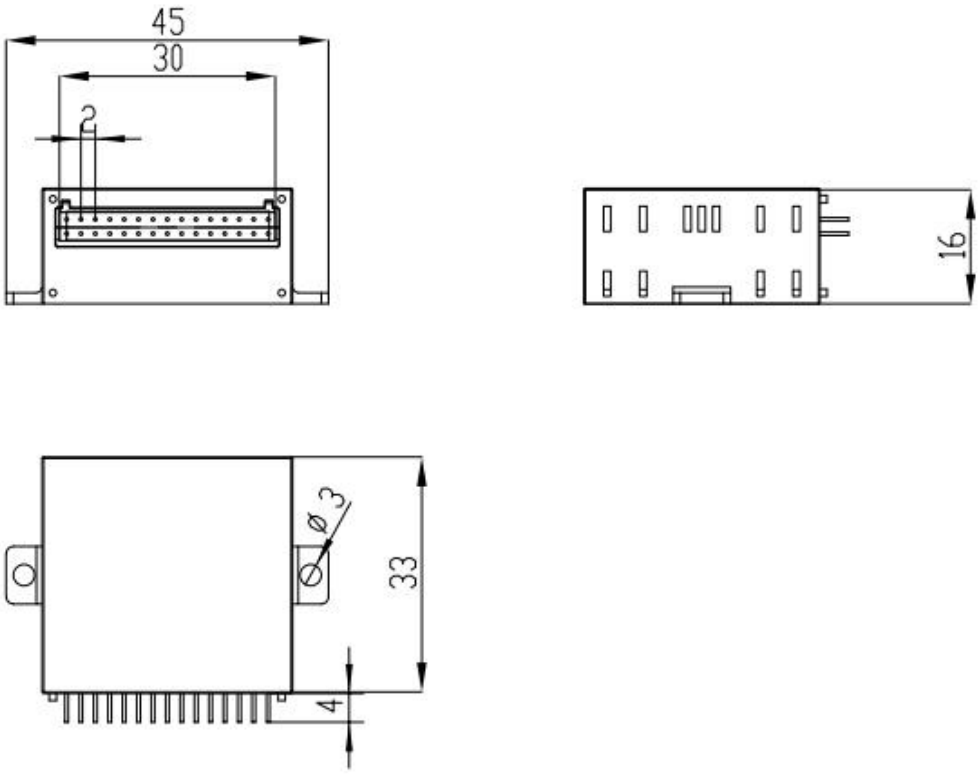
http://www.kaifull.net/

1. Technical Parameters

Driver model		Y2SD1-mini
Adaptive motor		Adapting to two-phase hybrid stepper motor; Y2SD1-mini can adapt to the current up to 2.5A
Power supply		15-24V DC
Output current		Y2SD1-mni:0.4A-2.5A/phase (peak)
Input signal	STEP (pulse) signal	Input voltage H=3.3-5V, L=0-0.8V
	DIR (directional) signal	
	EN (enabling) signal	
Output signal: OUT (alarm output)		Maximum output current 50mA
Dimensions		45× 33 ×16 mm
Service environment	Scenario	Avoid dust, oil mist, and corrosive gases
	Humidity	<85% RH, no condensation
	Temperature	-20°C - +40°C
	Heat dissipation	Installed in the ventilated environment

2. Installation



Mass: 0.12 kg

2.1 Mechanical Dimensions

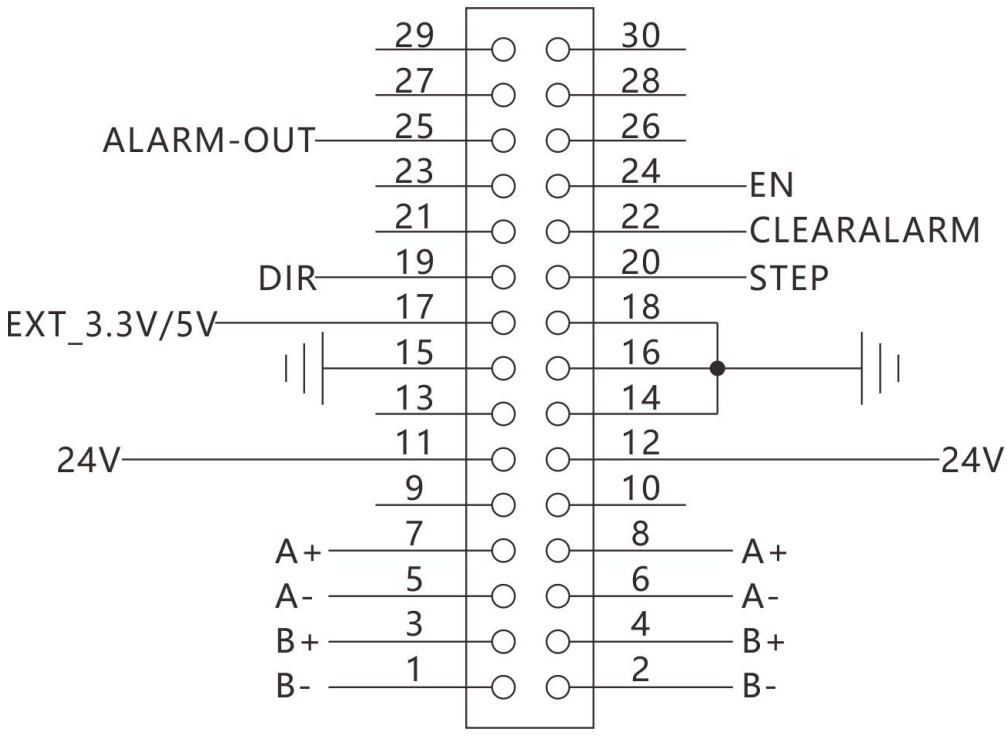
Driver installation:

Install with narrow edges and M3 screws through the holes on both sides. The power components of the driver will generate heat. If it operates continuously under high input voltage and high power conditions, the effective heat dissipation area should be expanded or forced cooling should be applied. Do not use it in areas with poor air circulation or environments with temperatures exceeding 40 ℃; do not install the driver at a damp place or at a place with scrap metal.

3. Port Wiring

With reference to the interface relationship diagram, you need to prepare:

- 15-24 VDC, DC power supply with appropriate rate of work
- Control signal source
- Matching Kaifull stepper motor



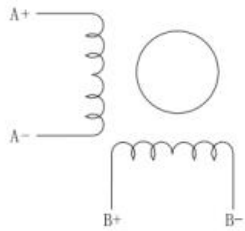
3.1 Power Connection

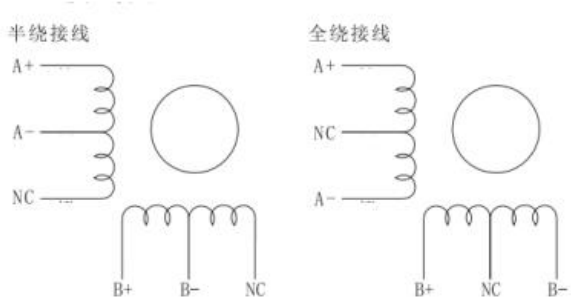
Connect the positive pole of the power supply to the V+of the driver and the negative pole of the power supply to the V - of the driver. Please be careful not to connect reversely, as the damage to the driver caused by reverse power connection cannot be covered by the warranty. Choose an appropriate power supply.

To make the motor provide better high-speed performance, you need to increase the supply voltage of the driver.

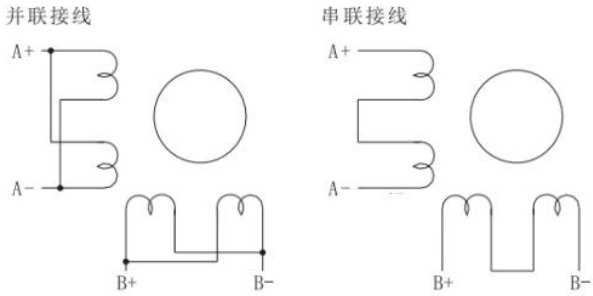
3.2 Motor Wiring

You can only use one method to connect the four-wire motor.





Eight-wire motors can be connected in two methods: series and parallel connection. The motor has a greater torque at the low speed and smaller torque at the high speed during the series connection mode. When operating in series, the motor needs to operate at a current which is equivalent to 50% of the current in the parallel connection mode to avoid overheating.



Warning: When connecting the motor to the driver, please confirm that the motor power has been turned off first. Confirm that the unused motor leads are not short-circuited to other objects. During the power-on period of the driver, the motor cannot be disconnected. Do not connect the motor leads to the ground or power supply.

4. Control Signal Connection

4.1 Pulse& Directional Signals

Y2SD1-mini can accept 3.3-5VDC single-end signal, with a valid signal falling edge. The direction of motor operation depends on the DIR level signal. When the SETP signal has a pulse signal, the DIR is at a low level, the motor will run clockwise; when the DIR signal is suspended or at a low level, the motor will run counterclockwise.

4.2 Enabling Signal

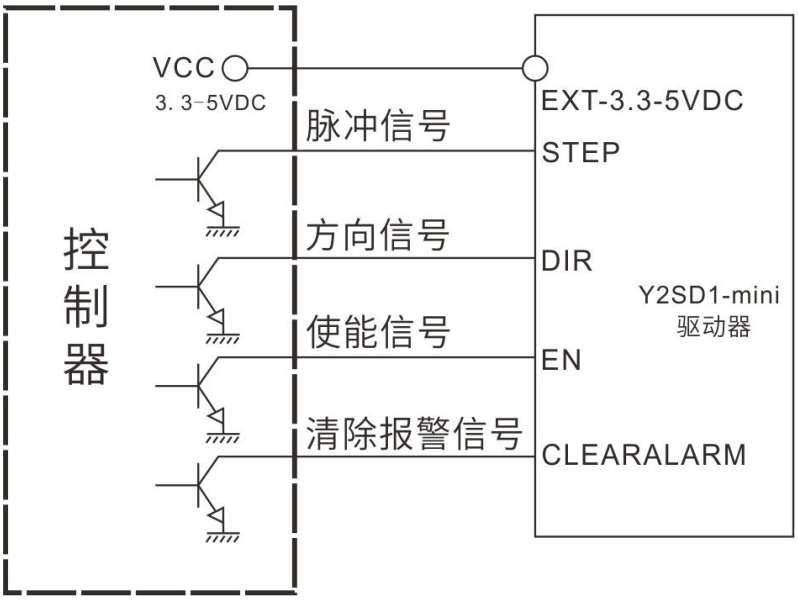
EN input enables or switches off the power part of the driver, and can accept 3.3-5VDC single-end signals. When the EN signal is suspended or at a high level, the driver will be enabled and the motor will operate normally; when the EN signal is at a low level, the power of the driver will be partially turned off, and the motor will not be excited. When the motor is in an error state, the EN input can be used to restart the driver. Firstly, eliminate the existing faults from the application system, and then input a falling edge signal to the EN end. The driver can restart the power part and the motor will be excited to operate.

4.3 Alarm Clearing Signal

When the alarm clearing signal is inputted to the CLEARALARM end, the single-end signal of 3.3-5VDC will be received. When the motor is in the error state, firstly eliminate the existing faults from the application system, and then input a falling edge signal to the CLEARALARM end. The driver can restart the power part and the motor will be excited to operate.

4.4 Control Signal Wiring Method

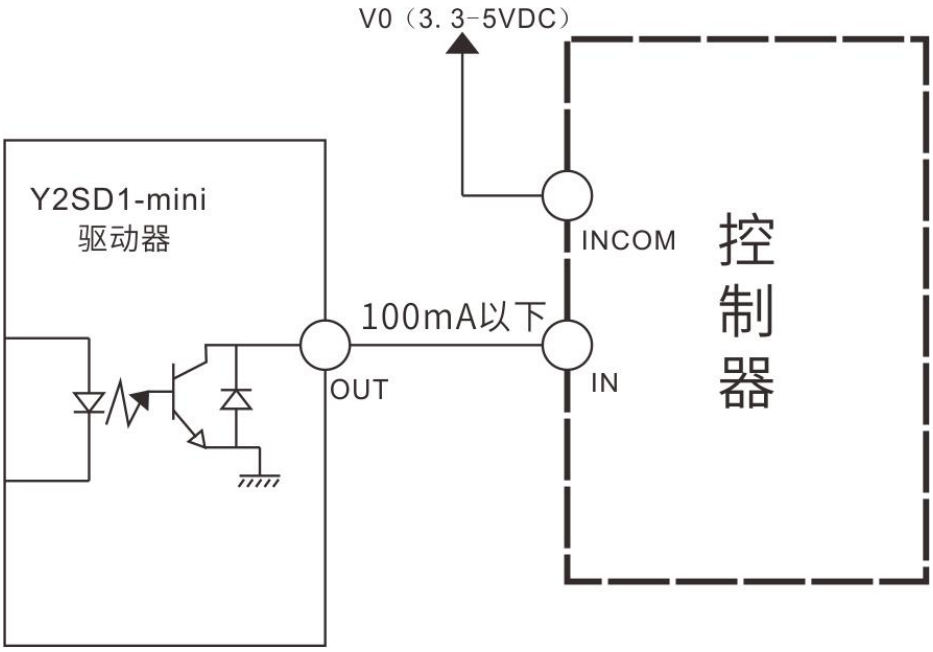
Collector connection method NPN



4.5 Alarm Output Signal

The maximum voltage that the alarm OUT port can withstand is 5.5VDC, and the maximum saturation current is 50mA

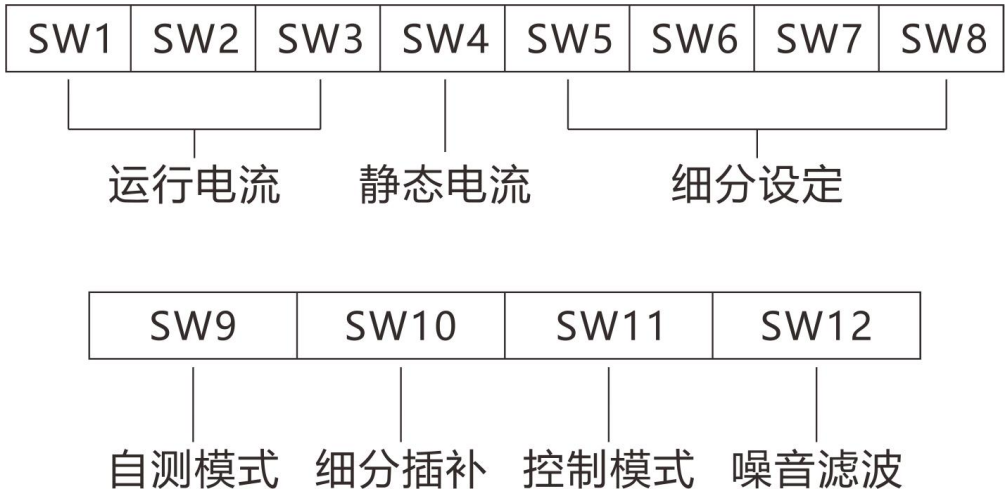
When the driver has no alarm, a 3.3/5V signal will be outputted



4.6 Driver Status Indicator Light

Indicator light status	Status	Description
Green light flashing	The driver operates normally	-
Green light normally on	The driver is not enabled	EN port has low-level input
3 red lights +1 green light	Driver overtemperature	The heat dissipation needs to be strengthened
4 red lights and 1 green light	Drive power input overvoltage	Excessively high supply voltage
5 red lights +1 green light	Driver overcurrent	Motor wiring error or poor contact
6 red lights +1 green light	Motor winding open circuit	The motor is not connected properly
3 red lights +2 green lights	Internal voltage error in the driver	Too small power
4 red LED lights and 2 green LED lights	Drive power input undervoltage	Excessively low supply voltage

5. Operating Parameters Setting of Driver



5.1 Current Setting

The Y2SD1-mini driver sets the peak output current through the SW1, SW2, and SW3 dial switches.

Generally, the current is set to the rate current of the motor. If your system has high requirements for heating, you can reduce the current appropriately to reduce the motor heating, but the output torque of the motor will also decrease. If you do not require the motor to run continuously, you may increase the operating current appropriately to obtain greater torque, but be careful not to exceed 1.5 times the rated current of the motor.

*Factory setting: minimum current

Operating current (peak)	SW1	SW2	SW3
2.5A	OFF	OFF	OFF
2.2A	ON	OFF	OFF
1.9A	OFF	ON	OFF
1.6A	ON	ON	OFF
1.3A	OFF	OFF	ON
1.0A	ON	OFF	ON
0.7A	OFF	ON	ON
0.4A	ON	ON	ON

5.2 Idle Current

The operating current of the driver can automatically decrease when the motor stops running, and SW4 sets the idle current as a percentage relationship of the operating current. When a high torque needs to be outputted, a 90% setting is the most effective. To reduce the heat generated by the motor and driver, it is recommended to minimize idle current as far as possible when allowed.

5.3 Subdivision Setting

The Y2SD1-mini driver sets subdivision values through SW5, SW6, SW7, and SW8 dial switches, with 16 options available.

Subdivision (pulse/revolution)	SW5	SW6	SW7	SW8
20000	OFF	OFF	OFF	OFF
10000	ON	OFF	OFF	OFF
8000	OFF	ON	OFF	OFF
6000	ON	ON	OFF	OFF
5000	OFF	OFF	ON	OFF
4000	ON	OFF	ON	OFF
2000	OFF	ON	ON	OFF
1000	ON	ON	ON	OFF
25600	OFF	OFF	OFF	ON
12800	ON	OFF	OFF	ON
6400	OFF	ON	OFF	ON
3200	ON	ON	OFF	ON
1600	OFF	OFF	ON	ON
800	ON	OFF	ON	ON
400	OFF	ON	ON	ON
200	ON	ON	ON	ON

5.4 Self-test Mode

When you set the dial switch to ON, the motor will perform forward and reverse reciprocating motion for two cycles at a speed of 1 rpm.

5.5 Self-test Mode

When you set the dial switch to ON, the motor will perform forward and reverse reciprocating motion for two cycles at a speed of 1 rpm.

5.6 Subdivision Interpolation

Select the smooth filtering function using the subdivision interpolation technology to set the switch SW10. Click "ON" to enable it and "OFF" to disable it. Smooth filtering of control signal makes the action of immediately changing the speed and direction of motor control smoother, and can reduce the wear of mechanical components in the system to prolong the service life of the equipment. This function will cause a delay in the control signal. Please choose or disable this function according to the application situation.

5.7 Control Mode

Select a control mode for setting the switch SW11; ON: pulse plus direction mode, OFF: dual pulse mode; you may select it according to the control method of the controller.

5.8 Stepping Noise Filtering

Select the digital signal filtering for setting the switch SW12; ON: 150KHz (suitable for low-division drive), OFF: 2MHz (suitable for high division drive).

6. Related Precautions:

Wiring requirements

(1)To prevent interference with the driver, it is recommended to use shielded cables for control signals, and the shielding layer should be short circuited to the ground wire. Unless otherwise specified, the shielded wire of the control signal cable should be grounded at one end: the upper computer end of the shielded wire should be grounded, and the driver end of the shielded wire should be suspended. Grounding is only allowed at the same point within the same machine. If it is not a true grounding wire, it may cause serious interference, and the shielding layer is not connected at this time.

(2) Pulse and direction signal lines are not allowed to be tied side by side with motor lines. It is best to separate them at least 10cm. Otherwise, the motor noise can easily interfere with pulse direction signals, causing motor positioning errors, system instability and other faults.

(3) If a power supply supplies multiple drivers, parallel connection should be adopted at the power supply, and chain connection from one to another is not allowed.

(4) It is strictly prohibited to plug and unplug the strong electric (motor and power) terminals of the driver with electricity. When the charged motor stops, there is still a large current flowing through the coil. You may cause a huge instantaneous induced electric potential to burn out the driver by plugging and unplugging the strong electric (motor and power) terminals.

(5) It is strictly prohibited to solder the wire head and connect it to the wiring terminal. Otherwise, it may overheat and damage the terminal due to increased contact resistance.

The wiring terminal should not be exposed outside the terminal to prevent accidental short circuit and damage to the driver

7. Contact Kaifull

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